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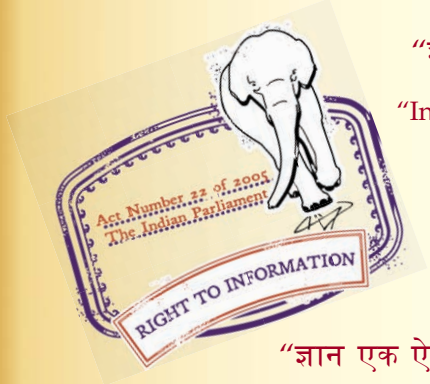

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SPECIFICATION FOR MAGNESITE FOR CHEMICAL INDUSTRY

(First Revision)

UDC 622·368·2

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 5·00 Gr 2

May 1980

Indian Standard

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(First Revision)

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Indian Standard

SPECIFICATION FOR MAGNESITE FOR CHEMICAL INDUSTRY

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 3 August 1979, after the draft finalized by the Inorganic Chemicals (Miscellaneous) Sectional Committee had been approved by the Chemical Division Council.

0.2 Magnesite occurs in two forms, namely, crystalline and amorphous. Amorphous form is commonly found in India. It is white in colour and breaks with conchoidal fracture. India has extensive deposits of high grade magnesite located in Mysore, Salem district of Tamil Nadu and in Almora district of Uttar Pradesh.

0.3 Magnesite is used in the manufacture of dead burnt magnesium oxide, epsom salts and caustic magnesia for magnesium oxychloride compositions, and in rubber and other chemical industries.

0.4 This standard was first published in 1966. The standard is now being revised in the light of experience gained during these years. In this revision the limit of iron oxide is being lowered from 1·0 to 0·4. Changes are also made in the method of test for calcium.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for magnesite used in chemical industry.

*Rules for rounding off numerical values (*revised*).

2. REQUIREMENTS

2.1 Description — The material shall be in the form of white lumps, and free from dirt and other foreign matter.

2.2 The material shall comply with the requirements given in Table 1, when tested according to the methods prescribed in Appendix A of this standard and IS:1760-1962*. Reference to the relevant test methods is given in col 4 and 5 of the table.

TABLE 1 REQUIREMENTS FOR MAGNESITE FOR CHEMICAL INDUSTRY

Sl No.	Characteristic	Requirement	Method of Tests, Ref to	
			Appendix	Cl No. in IS:1760-1962*
(1)	(2)	(3)	(4)	(5)
i)	Loss on ignition, percent by mass, *Min*	48·0	—	5
ii)	Silica (as SiO_2), percent by mass, *Max*	2·0	—	6
iii)	Alumina (as Al_2O_3), percent by mass, *Max*	0·3	—	7
iv)	Iron oxide (as Fe_2O_3), percent by mass, *Max*	0·4	—	8
v)	Magnesium (as MgO), percent by mass, *Min*	45·0	—	11
vi)	Calcium (as CaO), percent by mass, *Max*	1·0	A	—

*Methods of chemical analysis of limestone, dolomite and allied materials.

3. PACKING AND MARKING

3.1 Packing — Unless otherwise agreed between the purchaser and the supplier, the material shall be supplied in open wagons.

3.2 Marking — A good sized metallic or cardboard label bearing the following information with suitable paint or ink shall be conspicuously displayed on the carrier and also placed inside:

a) Name of the material;

b) Name of the supplier and the recognized trade-mark, if any;

c) Gross and net mass;

d) Date of supply; and

e) Batch number.

*Methods of chemical analysis of limestone, dolomite and allied materials.

3.2.1 The material may also be marked with the ISI Certification Mark.

NOTE—The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Preparation of Test Samples — Representative samples of the material shall be drawn as prescribed in IS : 2109-1962*.

4.2 Number of Tests — Tests for the determination of magnesium, silica and loss on ignition shall be conducted on each of the individual samples. Tests for the determination of the remaining characteristics shall be performed on the composite sample.

4.3 Criteria for Conformity — The lot shall be declared as conforming to the requirements of this specification if the conditions given in **4.3.1** and **4.3.2** are satisfied.

4.3.1 For each of the characteristics tested on individual samples (*see* **4.2**), all the test results satisfy the relevant requirements given in the specification.

4.3.2 All the test results on the composite sample satisfy relevant requirements given in the specification.

APPENDIX A

[*Clause* 2.2 and *Table* 1, *Item* (vi)]

DETERMINATION OF CALCIUM IN MAGNESITE

A-0. GENERAL

A-0.1 Calcium may be determined by two methods, namely, EDTA titration method and phosphate method. For routine analysis, the EDTA method prescribed here shall be followed; in case of dispute, phosphate method as prescribed in **11** of IS : 1760-1962† shall be followed.

*Methods of sampling dolomite, limestone and other allied materials.

†Specification for dolomite, limestone and allied materials.

A-0.2 Outline of the Method — The sample is treated with hydrochloric acid and insoluble matter is removed by filtration. Triethanolamine is added to form a complex with the R_2O_3 group and a known volume of standard EDTA is added. This volume is sufficient to complex all the calcium and the excess complexes its equivalent amount of magnesium; the remainder of the magnesium is then precipitated with sodium hydroxide. The magnesium EDTA complex is titrated with standard calcium solution using Patton and Reeder's indicator.

A-1. QUALITY OF REAGENTS

A-1.1 Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1977*) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

A-2. REAGENTS

A-2.1 Concentrated Hydrochloric Acid — *see* IS : 265-1976†.

A-2.2 Magnesium Sulphate Solution — Dissolve 25 g of magnesium sulphate ($MgSO_4.7H_2O$) in water, filter and dilute to 500 ml.

A-2.3 Sodium Hydroxide Solution — approximately 4 N.

A-2.4 Concentrated Nitric Acid — *see* IS : 264-1976‡.

A-2.5 Triethanolamine — 1:1 (*v*/*v*).

A-2.6 Standard Calcium Chloride Solution — 0·05 M. Dissolve 5·005 g of dried calcium carbonate in a slight excess of dilute hydrochloric acid (1:3). Boil to expel carbon dioxide, cool and dilute to 1 litre.

A-2.7 Standard Ethylenediamine Tetra-acetate (EDTA) Solution — Approximately 0·05 M. Dissolve 18·65 g of disodium tetra-acetate dihydrate in warm water, filter, cool and dilute to 1 litre.

A-2.8 Pattern and Reeder's Indicator — Intimately mix by grinding, about 0·1 g of Patton and Reeder's indicator with about 50 g of anhydrous potassium sulphate. Store in a well-stoppered bottle protected from light.

A-2.9 Ascorbic Acid — solid.

A-3. PROCEDURE

A-3.1 Standardization of EDTA Solution — Pipette 25 ml of the EDTA solution into a 500-ml conical flask and add 50 ml of magnesium sulphate

*Specification for water for general laboratory use (*second revision*).
†Specification for hydrochloric acid (*second revision*).
‡Specification for nitric acid (*second revision*).

solution, dilute to about 250 ml and shake well. Then add 25 ml of sodium hydroxide solution followed by 0·25 g of the indicator and again shake well. Immediately titrate with the calcium chloride solution till colour changes from blue to wine red. EDTA solution shall be standardized only when required.

A-3.2 Weigh accurately about 1 g of the dried and finely ground sample into a 250-ml beaker. Add 5 ml of water and 10 ml of concentrated hydrochloric acid, cover the beaker with a watch-glass and boil until all soluble matter dissolves. Add a drop of nitric acid and boil off the fumes of nitrous oxide. Rinse any deposit from the underside of the watch-glass into the beaker. Dilute to about 100 ml, filter and wash, collecting the filtrate and washings in a 500-ml conical flask. Cool, add 5 ml of triethanolamine, and pipette into the solution 25 ml of EDTA solution, then add sodium hydroxide solution, drop by drop with shaking until a slight permanent precipitate remains. Dilute to about 250 ml, add 25 ml of the sodium hydroxide solution, add about 1 g of the ascorbic acid and about 0·2 g of the indicator. Titrate immediately with the standard calcium chloride solution exactly as given in **A-3.1**.

A-4. CALCULATION

A-4.1 If 25 ml of the EDTA solution is equivalent to a ml of calcium chloride solution and b ml of the latter solution is used in the back titration, then the percentage of calcium oxide in the dry, unignited sample is $0{\cdot}2804\,(a-b)/m$, where m is the mass in g of the sample taken.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N=1kg. m/s^2
Energy	joule	J	1 J=1 N.m
Power	watt	W	1 W=1 J/s
Flux	weber	Wb	1 Wb=1 V.s
Flux density	tesla	T	1 T=1 Wb/m^2
Frequency	hertz	Hz	1 Hz=1 c/s (s^{-1})
Electric conductance	siemens	S	1 S=1 A/V
Electromotive force	volt	V	1 V=1 W/A
Pressure, stress	pascal	Pa	1 Pa=1 N/m^2

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Printed at Britannia Calendar Mfg Co, Calcutta, India